## REMARKS

In view of the above amendments and the following remarks, favorable reconsideration of the outstanding Office action is respectfully requested.

By virtue of the claim amendments supra, claim 32 has been canceled without prejudice as a result of a restriction requirement which was made final in the outstanding Office action. Applicants reserve the rights to file a divisional application for it. Claims 1, 3, 14 and 22 are currently amended. Claims 4-12 are withdrawn from consideration at the present stage due to a species restriction requirement which was made final in the outstanding Office action. Applicants understand that should the current claims, including the linking claims not be found unpatentable, these claims directed to non-elected species will be further examined.

### I. Restriction Requirements

Applicants note that the restriction requirement with regard to Groups I and II inventions have been made final. Claim 32, directed to Group II inventions, have been canceled without prejudice.

With regard to the species election requirement, as Applicants understand, further prosecution of claims 4-12, which are directed to the non-elected species, will be opened should the linking claims not be found unpatentable.

### II. Information Disclosure Statements

Applicants note that the Examiner did not consider the references cited in the IDS' filed by Applicants dated February 2, 2004, November 6, 2002 and October 26, 2001 were not considered by the Examiner. Applicants note with appreciation that the Examiner has lined out the references that he deemed problematic. Applicants provides the following comments and/or remedy.

With regard to reference AC (DE 19731075) in the IDS file by Applicants on February 2, 2004, Applicants submit that in the same patent family, a US patent, United States Patent No. 3,603,969, exits. Applicants submit a copy of this US patent in place of a description as to the relevancy of this German patent reference.

With regard to reference AD (DE 2,130,905) in the IDS file by Applicants on February 2, 2004, Applicants provide the following abstract thereof obtained from Derwent:

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WPI Acc No: 1973-03949U/197304
  Ceramic and/or metals in electric discharge vessels - -
  bonded with lithium salts
Patent Assignee: SIEMENS AG (SIEI)
Number of Countries: 001  Number of Patents: 002
Patent Family:
Patent No     Kind   Date    Applicat No    Kind   Date     Week
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DE 2130905 A 197304 B
DE 2130905 B 197327
Priority Applications (No Type Date): DE 271130905 A 19710622
Abstract (Basic): DE 2130905 A

Cohesive, vacuum tight bonds between ceramic bodies of the same or different composition in electric discharge vessels are made by applying to the respective surfaces a solution of, or binder free suspension of Li salt, pressing the surfaces together at 250 kg./cm2. and firing at 900-1,100 degrees C in a vacuum or inert gas atmosphere, and allowing to cool to room temp. over 30 mins. in an inert gas stream. Simpler than prior art soldering processes, and does not disturb ceramic properties in the function zone. Aqeuous LiF soln. or cold aqeous or alcoholic Li amide soln. are preferred. Pure or very pure Al and/or beryllium oxide are suggested substrates to be joined, at 150 kg./cm2. pressure and 1,000 degrees C.

Title Terms: CERAMIC; METAL; ELECTRIC; DISCHARGE; VESSEL; BOND; LITHIUM; SALT
Derwent Class: E34; L02; V05
International Patent Class (Additional): C04B-037/00; H01J-013/24; H01J-019/56; H01J-029/86; H01J-035/16

With regard to reference AK (Authur Landrock, "Surface Preparation of Adherends"; Adhesives Technology Handbook, 1985, page 117-118) in the IDS filed by Applicants on February 2, 2004, the Examiner indicated it to be in poor quality and thus cannot be read. Applicants submit that this reference was cited by the Examiner for co-pending patent application serial No. 10/035,564 co-assigned to the assignee of the present application. The original provided the Examiner in that application was not clear. Therefore, Applicants cannot supply a clearer photocopy thereof. However, Applicants note that the relevant parts of this reference are the texts from line 6 from the bottom, page 117 to line 10 from the bottom, page 118, which are reproduced as follows:

Glass (Non-Optical)[3,20]

Abrasive treatment (for general purpose bonding)

(a) Grit-blast with aluminum oxide or carborundum and water slurry (1 part by volume of 220 to 325-grit slurry of aluminum oxide or carborundum to 3 parts by volume of distilled water)
(b) Degrease in acetone or detergent
(c) Dry 30 minutes at 100°C (212°F). (The drying process improves the bond strength.)
(d) Apply the adhesive before the glass cools to the room temperature

Acid clean (for maximum strength)

(a) Clean in acetone or detergent
(b) Immerse for 10-15 minutes at 20°C (68°F) in:

| | |
|---|---|
| Sodium cichromate | 7 pbw |
| Sulfuric acid, conc. | 400 pbw |
| Water | 7 pbw |

(c) Rinse in tap water
(d) Rinse in distilled water
(e) Dry thoroughly

> Primers[2] – Adhesion to clean glass may be promoted by the use of silicone primers. The selection of primers depends on the particular adhesive system used. The addition of silane additives to the adhesive system also improves adhesion to glass.
>
> Glass (optical)
>
> Optical glass should never be subject to any acid or alkaline ...
> (a) Clean in ultrasonic equipment with a detergent solution, water, alcohol sequence
> (b) Air or oven-dry at less than 40°C
> If the optical glass is to be stored for any length of time, glass containers such as ... should be cleaned and dried, using the above sequence. The optical glass can then be safely stored in the cleaned glass container.

Applicants believe that the above information should enable the Examiner to make an informed decision as to the relevance of this reference to the present invention.

The Examiner indicated that a copy of the Japanese version of reference AL (JP 2000 56265A) provided in the IDS filed on November 6, 2002 was not submitted, even though an English translation was provided. Applicants submit a copy of the Japanese reference herewith for the Examiner's consideration.

The Examiner further indicated that references AJ, AL, AM, AN and AO submitted with the IDS filed on October 26, 2001 were incomplete in various ways. Applicants submit that complete copies of these references were submitted. Applicants submit that the citations as provided in the IDS form are sufficient to identify them in the journal systems. It is well known in the technical society that with information including author, article title, journal title, volume numbers, year and page numbers, an article is well identified and can be located with ease. It is therefore unreasonable and unnecessary, and indeed, contrary to common practice in the technical society, to further identify the month or exact date when the particular journal was published. For the purpose of avoidance of any confusion, Applicants re-submit a copy of all these references. Applicants further clarify that the citation of reference AM is as follows:

A. Yamada et al., Bonding Silicon Wafer to Silicon Nitride With Spin-on Glass Adhesive, Electronics Letters, March 26, Vol. 23 (1987), No.7, page 314-15.

Applicants respectfully request the Examiner to consider all references identified in these references.

**III. Claim Objections**

The Examiner objected to claim 3. Applicants have amended claim 3 to clarify that the bonding surfaces are rendered hydrophilic. Therefore, no additional layer of material is inserted between the bonding surfaces.

**IV. Rejections under 35 U.S.C. § 112**

The Examiner has rejected claims 1-3 and 13-31 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point and distinctly claim the subject matter which applicant regards as the invention.

The amendments to claims 1, 14 and 22, supra, have rendered the issues raised by the Examiner moot.

**V. Rejections under 35 U.S.C. § 103**

In a rejection under 35 U.S.C. § 103, the Examiner bears the initial burden of establishing a prima facie obviousness case. If the Examiner does not produce a prima facie obviousness case, the applicant is under no obligation to submit evidences of non-obviounsness. The MPEP, Eighth Edition, 2142.

A proper prima facie case of obviousness requires the examiner to satisfy three requirements. First, the prior art relied upon, coupled with knowledge generally available to one of ordinary skill in the art, must contain some suggestion which would have motivated one of ordinary skill to combine references. See In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Second, the examiner must show that, at the time the invention was made, the proposed modification had a reasonable expectation of success. See Amgen v. Chugai Pharm. Co., 927 F.2d 1200, 1209, 18 USPQ2d 1016, 1023 (Fed. Cir. 1991). Finally, the combination of references must teach or suggest each and every limitation of the claimed invention. See In re Wilson, 424 F.2d 1832, 1385, 165 USPQ 494, 496 (CCPA 1970). Moreover, both the suggestion and the reasonable expectation of success must be found in the prior art, not in the applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1438, 1442 (Fed. Cir. 1991).

The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." In re Fritch, 23 U.S.P.Q.2d 1780, 1783-84 (Fed. Cir. 1992).

(1) The rejection over Le Noane et al. in view of Coucoulas et al.

The Examiner has rejected claims 1-3, 14-15 and 22-24 under 35 U.S.C. § 103 (a) as being unpatentable over Le Noane et al. (United States Patent No. 4,407,667) or in view of Coucoulas et al. (United States Patent No. 3,860,405).

The Examiner asserted that

> LeNoane discloses the invention substantially as claimed (see figure 3 and the associated text). LeNoane does not teach the temperature of bonding. It

would have been obvious to perform routine experimentation to determine the optimal temperature.

Using Coucoulas: Col. 8, lines 1-9 is evidence that routine experimentation would result in the best temperature for bonding glass items would be below the softening temperature – because it is the "only" way to get satisfactory results.

Alternatively: it would have been obvious to one of ordinary skill in the art not to go above the softening temperature, because Coucoulas discloses satisfactory bonding occurs "only if" the temperature is below the softening temperature.

Applicants respectfully traverse this rejection, with the above claim amendments duly taken into consideration. Column 8, lines 1-9 of Coucoulas et al. is reproduced as follows:

> We have discovered that, regardless of whether a compliant bonding member is used for not, satisfactory bonding occurs only if either or both of the workpieces to be bonded attain a temperature during bonding at which plastic deformation occurs, i.e., the region on FIG. 19 to the right of the transformation temperature $T_g$ or the equivalent point on FIG. 20 which is to the right of the annealing point, but in either case, advantageously well below the softening point.

This paragraph clearly shows that the Examiner's above reading of Coucoulas et al. is incorrect.

Contrary to the Examiner's reading of this part to mean that it requires the temperature to be lower than the softening temperature to obtain satisfactory bonding, if this part of Coucoulas et al. is regarded as written in standard English, it means that: (i) satisfactory bonding can be attained only when temperature is higher than a certain point, i.e., higher than the $T_g$ or the annealing point; (ii) satisfactory bonding can be attained only when plastic deformation of the glass occurs; and (iii) when the temperature is higher than the $T_g$ or the annealing point, plastic deformation of the glass occurs; and (iv) it is only preferred, but not required, that the temperature is below the softening point.

It is clear from Coucoulas et al. Figs. 19 and 20, the $T_g$ and annealing temperature are both well above 400°C. Moreover, as is clear from the specification of the present application, one of the purposes of the present invention is to avoid the deformation of the preforms during bonding.

Therefore, the combination of Le Noane et al. and Coucoulas et al. does not teach or suggest an effective bonding at a temperature lower than 300°C.

Therefore, the combination of Le Noane et al. and Coucoulas et al. does not establish a prima facie obviousness case of claims 1-3, 14-15 and 22-24, as amended, of the present application.

Therefore, Applicants respectfully request the Examiner withdraw this rejection under 35 U.S.C. § 103.

(2) The rejection over Le Noane et al. (or Sterling et al.) in view of Gwo

The Examiner further rejected claims 13-31 under 35 U.S.C. § 103(a) as being unpatentable over Le Noane (or Sterling (United States Patent No. 4,195,980)) in view of Gwo (United States Patent No. 6,284,085).

The Examiner asserted that

> LeNoane (as well as Sterling) discloses the bonding of glass performs, but not the temperature limitation. Gwo teaches that one can create a strong room-temperature bond in a manner which is simple and inexpensive. It would have been obvious to change the Le Noane (or the Sterling) process, by using the improved bonding procedures of Gwo, for the advantages of Gwo. Relevant portions of Gwo include the abstract, col. 1, lines 22-29, from col. 1, line 61 to col. 2, line 19, col. 3, lines 37-62; col. 6, lines 42-62.

Applicants respectfully traverse the above rejections, with the above claim amendments duly taken into consideration.

Sterling et al. teaches a method in which the fiber performs are bonded at a temperature higher than 300°C.[1] In addition, in view of the teaching of Sterling et al., it appears to a reasonable English reader having ordinary skill in the art that a high temperature sufficient to deform the glass involved is indispensable. Therefore, Sterling et al., if anything, teaches away from the present invention, where the bonding is effected to a sufficient strength at a low temperature below 300°C. One of ordinary skill in the art thus will not be motivated to combine Sterling et al. with Gwo et al.

Le Noane et al. teaches the bonding of fiber preforms and drawing thereof into fibers. The limited teaching as to bonding of the preforms are reproduced as follows:

> The bars are then successively introduced into the apparatus where they are welded to each other at a welding station, forming a part of the apparatus. Referring to FIGS. 3 and 4, there are shown two successive bars 7 and 8 being welded at station 10. The bars are guided and moved continuously by driving means, shown schematically in FIG. 3 as comprising two sets of rollers 11 placed upstream of welding station 9 and a set of centering rollers 12 placed downstream.

Column 4, lines 2-11, Le Noane et al.

Typically, the term "weld" involves heating to a high temperature where a welding agent (a solder or a frit, for example) or the objects being welded soften in order to effect the bonding.

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[1] The term "fusion" is consistently used in Sterling et al. when describing the bonding of the preforms. In addition, it is described in Sterling et al. that heating is required to effect the bonding. As an example of the heating, $CO_2$ laser heating is provided in column 2, lines 48-62. Applicants thus have reason to believe that the bonding as taught in this reference is conducted at a temperature higher than 300°C. In the process taught in this reference, in addition to the end-to-end bonding of fiber preforms, side-to-side bonding of firber preforms and the sleeve tubes, as well as the end-to-end bonding between the sleeve tubes, were required. This further corroborate the understanding that the bonding has to be effected as an elevated temperature much higher than 300°C.

Therefore, clearly the teaching of Le Noane et al. requires a high temperature and/or the use of a welding agent.

As is clear from the present invention, the bonding of the glass article and fiber preform according to the present invention does not involve the use of an adhesive or a welding agent. It is direct bonding between bonding surfaces that is involved in the present invention.

Gwo teaches direct bonding of surfaces that can be effected at a low temperature. However, Gwo does not teach the direct bonding of fiber preforms. Gwo does not teach the further drawing of the bonded objects. Gwo does not teach whether the bonding surfaces have the required flatness in the claims of the present application, as amended herein. Gwo does not teach whether the bonding has the required strength in the claims of the present application, as amended herein. Gwo does not teach or suggest that the bonding strength would be sufficient for further drawing of the bonded articles, especially for drawing fibers at an elevated temperature and under tensile stress. Even assuming, arguendo, Gwo suggests, to a slight degree, that the bonding might be sufficient strong for down-stream drawing, Gwo does not teach or suggest the process conditions, such as the flatness of the bonding surfaces, to achieve the high bonding strength. In addition, Gwo clearly teaches that mis-matching surfaces can be bonded using the process disclosed therein. Applicants submit that it is clear that highly irregular surfaces cannot bond to sufficient strength for drawing by using direct bonding at a low temperature below 300°C.

Therefore, Applicants respectfully submit that the combination of Le Noane et al. (or Sterling et al.) with Gwo does not establish a prima facie obviousness case of claims 13-31, as amended, because: (i) the combination does not teach or suggest all the claim limitations; (ii) there is no motivation from the teachings of these references to combine them; and (iii) there is no reasonable expectation of success in combining the teachings thereof.

Therefore, Applicants respectfully request the Examiner withdraw this rejection under 35 U.S.C. § 103 over Le Noane et al. (or Sterling et al.) in view of Gwo.

## VI. Conclusion

Applicants believe that the claims being examined are not unpatentable over the references the Examiner considered. Applicants believe other issues the Examiner raised in the outstanding Office action have been resolved.

Applicants respectfully request the Examiner to consider the references Applicants submitted previously in the next Office action.

Applicants respectfully request the Examiner to further examine the withdrawn claims 4-12 in response to a species election requirement, should the Examiner find that the claims being examined are not unpatentable.

Applicants believe that no extension of time is necessary to make this Response timely. Should Applicants be in error, Applicants respectfully request that the Office grant such time extension pursuant to 37 C.F.R. § 1.136(a) as necessary to make this Response timely, and hereby authorize the Office to charge any necessary fee or surcharge with respect to said time extension to the deposit account of the undersigned firm of attorneys, Deposit Account 03-3325.

The undersigned attorney is granted limited recognition by the Office of Discipline and Enrollment of the USPTO to practice before the USPTO in capacity as an employee of Corning Incorporated. A copy of the document granting such limited recognition either has been previously submitted or is submitted herewith for the record.

Please direct any questions or comments to the undersigned at (607) 248-1253.

Respectfully submitted,

Date: September 2, 2004

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Date of Deposit: Sept. 2, 2004

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date indicated above with sufficient postage as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Siwen Chen